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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/532,022	03/21/2000	Yuji Sudoh	35.G2558	7470
5514	7590	05/07/2004	EXAMINER	
FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112			NGUYEN, HUNG	
			ART UNIT	PAPER NUMBER
			2851	

DATE MAILED: 05/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application N .

09/532,022

Applicant(s)

SUDOH ET AL.

Examiner

Hung Henry V Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 25-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 25-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 25-29, 31-33, 36-41, 43-45, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al (U.S.Pat. 4,475,223) in view of Ushida et al (U.S.Pat. 5,530,518) and further in view of Shiraishi (U.S.Pat. 6,020,950).

With regard to claims 25-29, 37-41, 36 and 48, Taniguchi et al discloses an exposure apparatus for performing exposure using X-rays (6) in a vacuum (2), wherein the X-rays/or EUV is scattered by the pattern (see col.4, lines 9-11) and comprising a projection optical system for projecting a predetermined pattern formed on a mask onto a substrate (see fig.4). Taniguchi lacks to show "a diaphragm and a cooling device which cools the diaphragm". Ushida et al (fig.1) discloses an projection exposure apparatus having a projection optical system (10) for projection a pattern formed on a reticle (9) onto a photosensitive substrate (11) and a diaphragm (10a) for setting the numerical aperture of the projection optical system. Even though, Ushida does not expressly disclose the diaphragm is not irradiated when no pattern is formed on the reticle, this teachings is seen to be an inherent teaching and it does not constitute any limitation in any patentable sense because one having ordinary skill in the art at the time the invention was

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made would provide **no** light beam on the diaphragm when no pattern is formed on the reticle because clearly, at this time, irradiation of the diaphragm is not necessary and is a redundancy. Shiraishi (figs 4 and 5) teaches a projection optical system having a cooling member (see fig.5) for cooling the light shielding plate arranged therein whereby “the system is free from heat generation caused by light absorption” (see col.5, lines 15-18) wherein the cooling means comprises a cooling fluid circulation system (Ko,Ki). In view of such teachings, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Taniguchi, Ushida, and Shiraishi to obtain the claimed invention.

With respect to claims 31 and 43, it is noted that the temperature of fluid is controlled (see col.14, lines 5-7). Therefore, a temperature sensor is an inherent device of the cooling means to detect the temperature information of the light shielding plate.

As to claims 32-33, and 44-45, it is the examiner’s position that it would have been obvious to a skilled artisan to preferably disposed the temperature sensor on the side facing the substrate. In other words, the sensor is disposed on a plane opposite to the light source whereby the sensor is not influenced by the exposure beam.

It would have been obvious to a skilled artisan to employ a diaphragm as taught by Ushida into the exposure device of Taniguchi for adjusting the numerical aperture thereby improving the resolution of the images to be printed and to utilize the cooling means as taught by Shiraishi into the diaphragm of Ushida so that the numerical aperture diaphragm may be prevented from increasing its temperature due to absorption of light and thus a deviation of the projection optical system can be avoided and the quality of the images to be printed is greatly improved.

3. Claims 30, 34-35, 42 and 46-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi in view of Ushida et al (U.S.Pat. 5,530,518) and further in view of Shiraishi (U.S.Pat. 6,020,950) and further in view of Nishi et al (U.S.Pat. 5,894,341).

As to claims 34-35, and 46-47, Taniguchi as modified by Ushida, as well as Shiraishi comprising substantially of the limitations of the instant invention as discussed above except for the aperture diaphragm comprises an iris diaphragm and a turret having a plurality of openings. However, a variable aperture of a turret type is known per se. For instance, Nishi teaches an aperture comprising "iris diaphragm and a turret with a plurality of openings". (see figs.2a, 2b). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a variable aperture of a turret type as taught by Nishi in the device of Ushida as modified by Shiraishi for varying the numerical aperture of the projection optical system.

As to claims 30 and 42, Taniguchi as modified by Ushida et al, Shiraishi lacks to show a cooling device with a "Peltier element". Using a "Peltier element" in a cooling mechanism is also well known in the art. For example, Nishi teaches Peltier element (30) for cooling the bottom face of the temperature adjustment plate (20). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ "Peltier element" as taught by Nishi into the cooling device of Shiraishi for the purpose of cooling the aperture stop and thus the aperture stop can be prevented from increasing its temperature due to absorption of light.

***Response to Amendment/Argument***

4. Applicant's amendment filed April 7, 2004 has been entered. Applicant's arguments with respect to prior art have been carefully reviewed in conjunction with the amendment but they are not found persuasive. Again, Applicant merely repeated the claim limitations and stated that the cited arts do not teach or suggest the features of present invention as claimed. Again, Applicant is reminded the rejection here is made under 35 U.S.C. 103(a). Therefore, the issue here is whether or not one of ordinary skill in the art would incorporate the teachings of the prior arts to come up with the instant invention. Applicant's arguments is absolutely silent in respect to this issue and only against the references individually, but one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). As clearly indicated in the office action, Ushida teaches a diaphragm (10a) for setting the numerical aperture of the projection optical system; Shiraishi teaches a mechanism including a heat moving device (Gb) located between the outer edge and the opening of a light shielding plate placed in the projection lens for cooling off the light shielding plate. In lithography art, since "the diaphragm" for setting the numerical aperture of the projection optical system and "the light shielding plate" in a broadest sense, both may be regarded as "plate like member" and are deformed by same effects such as thermal expansion caused by exposure light. The solving solution for the "light shielding plate" would be the same for the "diaphragm". Therefore, it would have been obvious to a skilled artisan to employ the mechanism for cooling off the "light shielding plate" as disclosed by Shiraishi for the same purpose of cooling off the "diaphragm" of Ushida. As discussed above, newly added

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limitations (of “wherein the diaphragm is not irradiated by the EUV or X-rays when no pattern is formed on the first object” and “EUV or X-rays which is scattered by the pattern” (it is the Examiner’s position that EUV or X-rays used in an exposure device, for example, in Taniguchi, must be scattered by the pattern formed on the reticle)) are inherent teachings of an exposure apparatus and thus they do not constitute any limitations in any patentable sense and they are not given any patentable weight. For the going reasons, the rejections under 35 U.S.C. 103 are maintained.

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

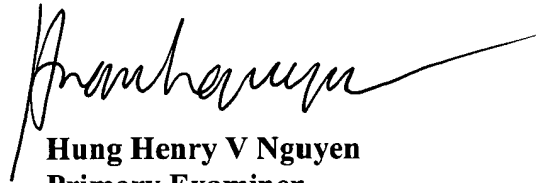
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Henry V Nguyen whose telephone number is 571-272-2124. The examiner can normally be reached on Monday-Friday (First Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ Adams can be reached on 571-272-2112. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**Hung Henry V Nguyen**  
**Primary Examiner**  
**Art Unit 2851**

hvn  
5/3/04